



## **Assessment of the probability of tsunamis along Chile accounting for multiple uncertainties**

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Chile is known as one of the most tsunamigenic tectonic margins in the world. At least 140 tsunamis have been registered in the last five centuries as described in the historical records, and lately recorded by tide gauges (NGDC/WDS). The 1960 Mw 9.5 and the 2010 Mw 8.8 Maule earthquakes have raised awareness for coastal planning and development of early warning systems. However, up-to-date there are no probabilistic tsunami hazard assessments (PTHA) in the region that could be used for local and regional risk assessments. In this study we present the first country-based PTHA, where multiple sources of uncertainty have been incorporated to obtain tsunami height exceedance rates along Chile. Also, probabilistic tsunami maps are generated for selected coastal cities. The main steps in the probabilistic framework follow firstly the development of a homogenized earthquake catalog and the segmentation of the tectonic margin. Within these segments earthquake rates are estimated using different statistical techniques, including Monte Carlo and importance sampling, to generate synthetic catalogs. These catalogs are the input for tsunami numerical modeling. The output is given either as tsunami wave heights along the coast when using the linear approximation, or inundation heights for selected cities. Integrating the results provide exceedance probabilities for different thresholds. Combining results in a logic tree allows for different seismo-tectonic models, and/or different assumptions of maximum expected magnitudes. This approach aims to provide a more robust and reliable method for the country.